Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–III (NEW) EXAMINATION – WINTER 2020

Subject Code:3131707 Date:05/03/2021

Subject Name:Network Analysis

Time:10:30 AM TO 12:30 PM Total Marks:56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			Marks
Q.1	**(a)**	Define the following terms: (I) Graph (II) Tree (III) Node	**03**
	(b)	Explain DOT convention with suitable example.	**04**
	(c)	Evaluate mesh-currents I_1 and I_2 in the following circuit (fig. 1)	**07**

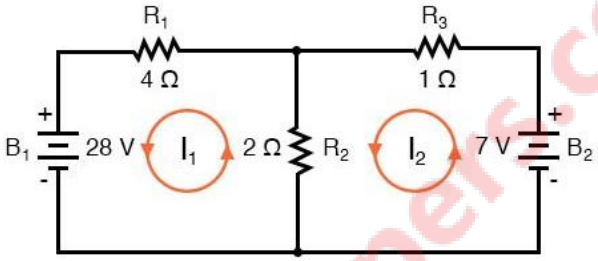

Fig. (1)

Q.2	**(a)**	Explain the ideal Sources and controlled Sources in electrical circuits.	**03**
	(b)	Explain fundamental cut-set matrix.	**04**
	(c)	Prove that the condition (Rth = RL) for maximum power transfer theorem.	**07**
Q.3	**(a)**	Define the following terms : (I) Linear Network (II) Passive Network (III) Active network	**03**
	(b)	Construct the dual network for the following circuit (fig. 3).	**04**

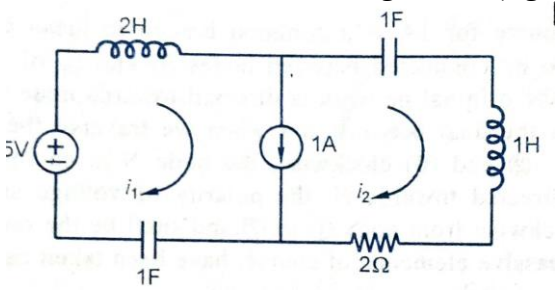

Fig.(3)

	(c)	Construct the graph, tree and co-tree for the following circuit (fig. 4).	**07**

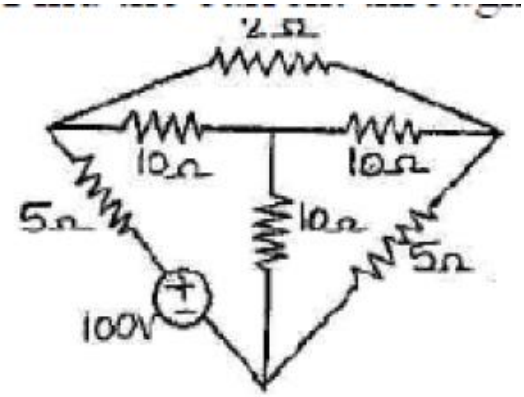

Fig. (4)

Q.4 **(a)** State the Kirchhoff voltage law (KVL) and the Kirchhoff current law (KCL). **03**

(b) Explain the procedure for solving network using Thiamin's Theorem. **04**

(c) Minimize the following network (fig. 5) using Source transformation rules and estimate the value of current (i). **07**

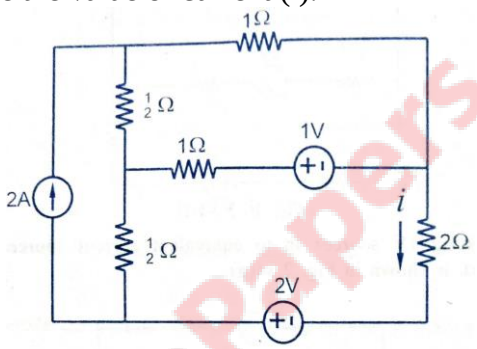

Fig. (5)

Q.5 **(a)** Define time constant and show the time constant of RL and RC circuits. **03**

(b) How the following elements will behave at t=0 and t=∞. Draw the equivalent network as well. (a) Inductor (b) Capacitor. **04**

(c) In the network of the fig. (6), the switch K is closed at t = 0 with capacitor uncharged and with zero current in the inductor. Find the values of i, di/dt and d^2i/dt^2 at t = 0+, if V=200V, R=20Ω, L=2H and C=10μF. **07**

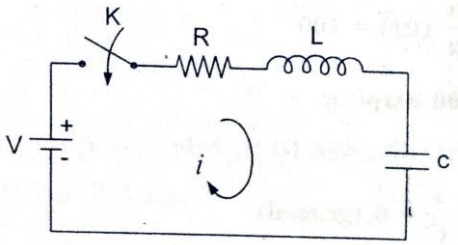

Fig. (6)

Q.6 **(a)** Determine Z parameters in terms of Y parameter. **03**

(b) Explain about poles and zeroes of network functions and their physical significance. **04**

(c) Evaluate the general solution i(t) for the following network (fig. 7). **07**

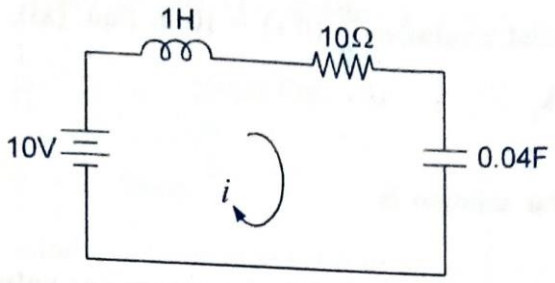

Fig. (7)

Q.7 **(a)** Summarize the conditions for reciprocity and symmetry of all the two port parameters. **03**

(b) Explain final value theorem. **04**

(c) Solve the network (fig. 8) for Z parameters. **07**

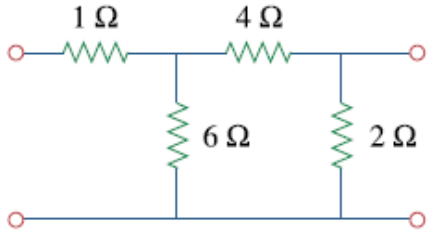

Fig. (8)

Q.8 **(a)** List the advantages of Laplace transformation method over classical methods for solving the differential equations. **03**

(b) Determine the Laplace transform of the function **04**
$f(t) = e^{-at} \cos(wt)$

(c) Solve the network (fig. 9) for Y parameters. **07**

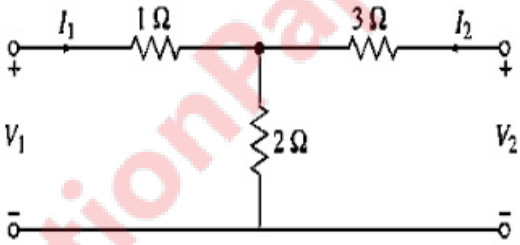

Fig.(9)

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